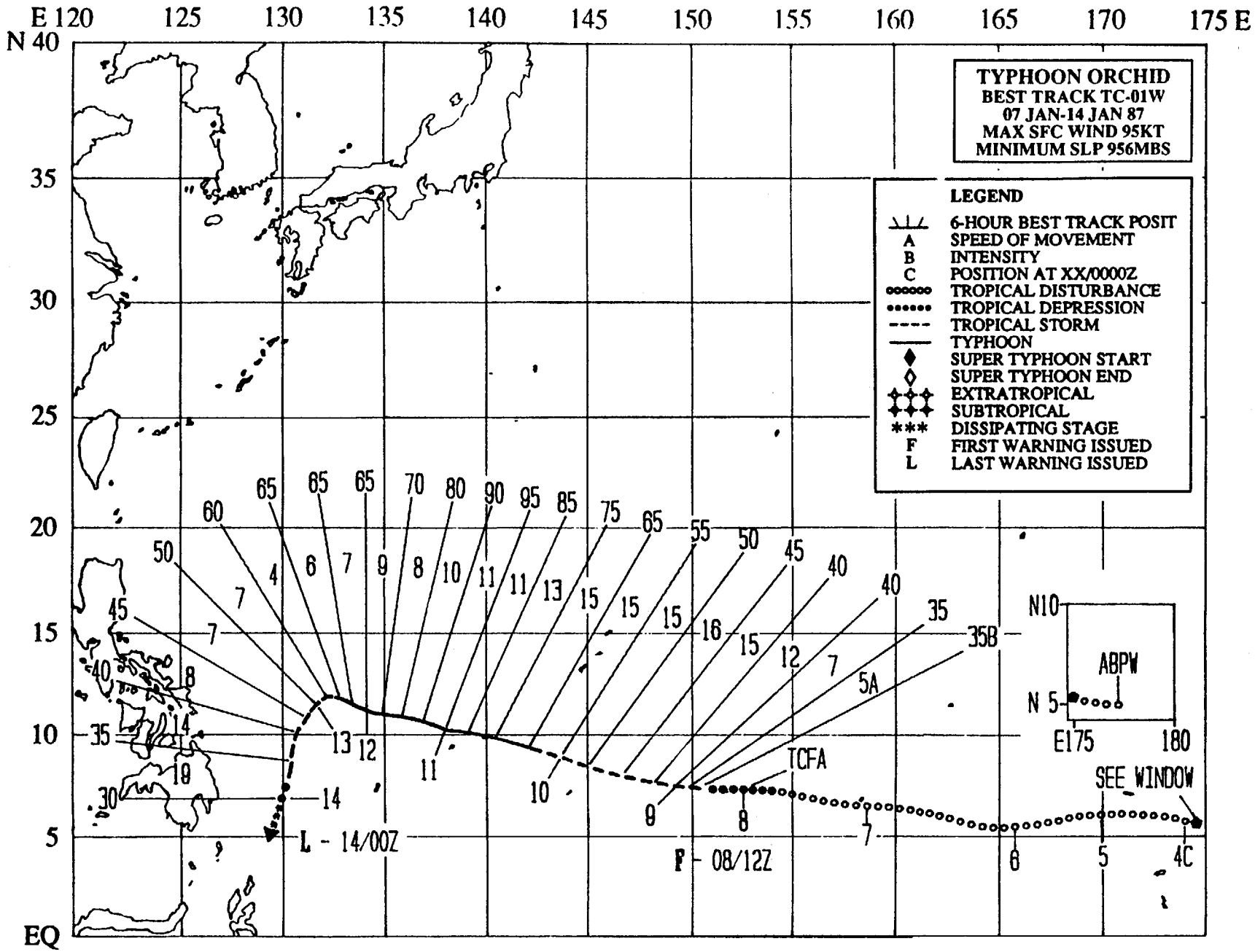
E 120
125
130
135
140
145
150
155
160
165
170
175 E
N 40
35
30
25
20
15
10
5
EQ
TYPHOON ORCHID
BEST TRACK TC-01W
07 JAN-14 JAN 87
MAX SFC WIND 95KT
MINIMUM SLP 956MBS
LEGEND
6-HOUR BEST TRACK POSIT
SPEED OF MOVEMENT
INTENSITY
POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
SUBTROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
L - 14/00Z
F - 08/12Z
TCFA
SEE WINDOW
N10
ABPW
N 5
E175
180

TYPHOON ORCHID (01W)

Typhoon Orchid (01W), the first tropical cyclone of 1987, was an unusually small system. It transited across the wintertime western North Pacific before being sheared apart by the northeast monsoon east of the Philippines.

The disturbance that eventually developed into Typhoon Orchid was first detected at 0000Z on January 3rd as a small area of persistent convection in the near-equatorial trough near the dateline. It was first mentioned on the Significant Tropical Weather

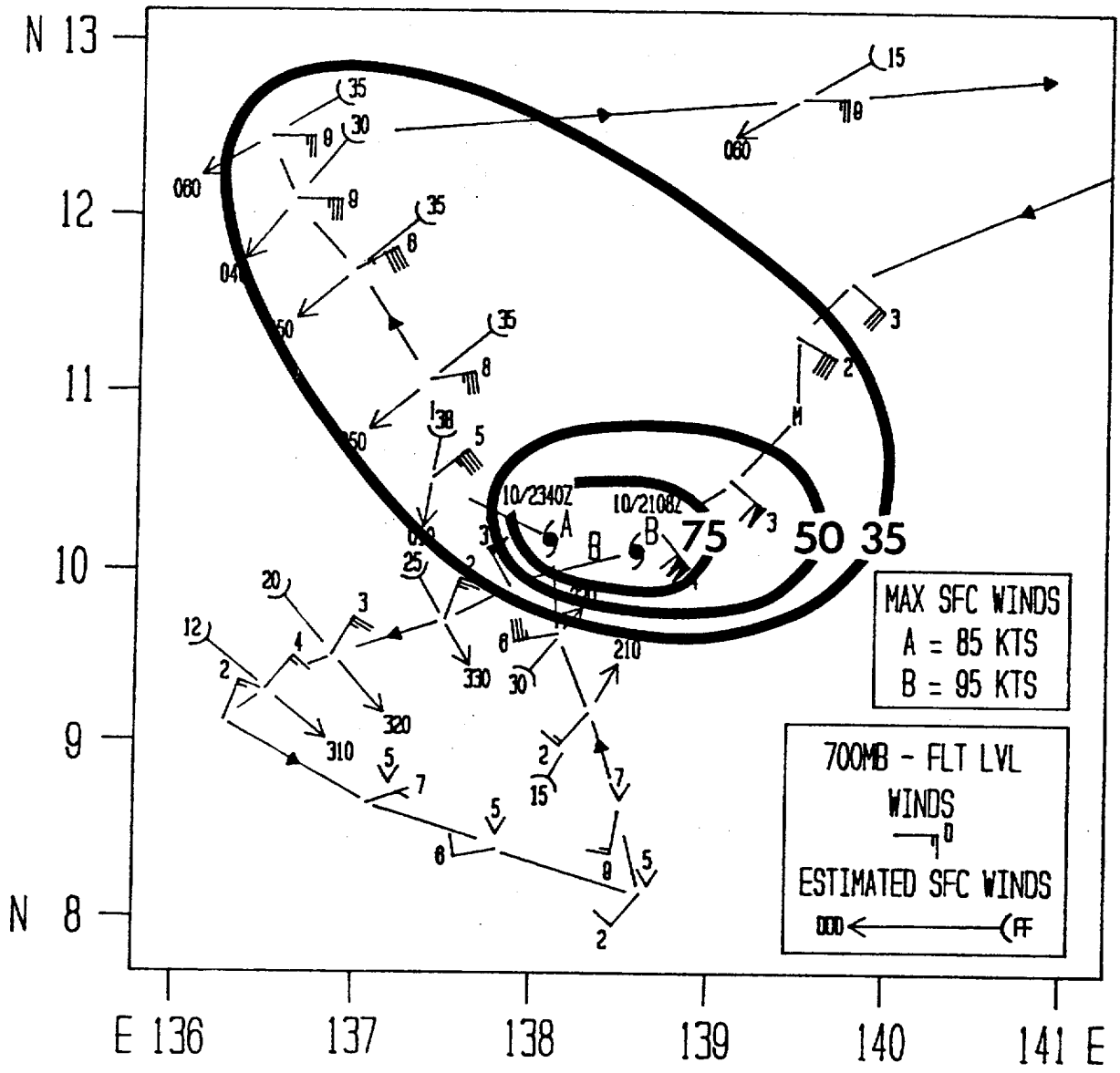

Figure 3-01-1. The 110000Z January aircraft reconnaissance fix mission of Typhoon Orchid (01W) near maximum intensity. Note the tight gradient of surface winds to the south of the vortex center.

Figure 3-01-2. Damage to the Outer-Island School located on the north side of Falalop Island on the Ulithi Atoll. All these buildings sustained some damage while others (dormitories and classrooms) were totally destroyed (Photo courtesy of Mobil Oil Micronesia, Inc.).

Advisory (ABPW PGTW) at 030600Z. Over the next four to five days, this area drifted toward the west and slowly increased in organization and convection until a small ragged central dense overcast (CDO) formed and upper-level outflow improved. A Tropical Cyclone Formation Alert followed at 072130Z and a daylight hours aircraft reconnaissance investigative mission was tasked for the next day. No surface data was available near the system; however, at 080419Z Dvorak satellite intensity analysis of the disturbance estimated maximum sustained surface winds of 25 to 30 kt (13 to 15 m/sec). This prompted JTWC to issue the first warning on Tropical Depression 01W at 081200Z. The next morning, the aircraft investigative mission reported maximum sustained surface winds of 45 kt (23 m/sec). This prompted the upgrade of the system on the third warning (at 090000Z) to Tropical Storm Orchid (01W).

Figure 3-01-3. Corrugated sheet roofing embedded in a coconut log on Falalop Island on Ulithi Atoll. This building material becomes a deadly object to life and property when airborne (Photo courtesy of Mobil Oil Micronesia, Inc.).

There were two unusual aspects of Typhoon Orchid (01W). The first was its small radius of maximum winds. For example, at its peak intensity of 95 kt (49 m/sec) at 110000Z, the radii of 30 kt (15 m/sec) winds were only 45 nm (83 km) in the south semicircle and 140 nm (259 km) in the northwest semicircle (see Figure 3-01-1). The larger wind radius in the northwest semicircle was due partly to interaction with high pressure ridging to the north and the motion vector addition to the winds in the west-northwest, or right front, quadrant. Typhoon Orchid (01W), near maximum intensity, passed directly over the island of Ulithi (WMO 91203). As a result, Ulithi reported surface winds near 100 kt (51 m/sec) and sustained extensive damage (Figures 3-01-2 and 3-01-3). A few hours later, however, Typhoon Orchid passed about 45 nm (83 km) north of the island of Yap (WMO 91413), where surface winds of only 20 to 25 kt (10 to 13 m/sec) and fair skies were reported.

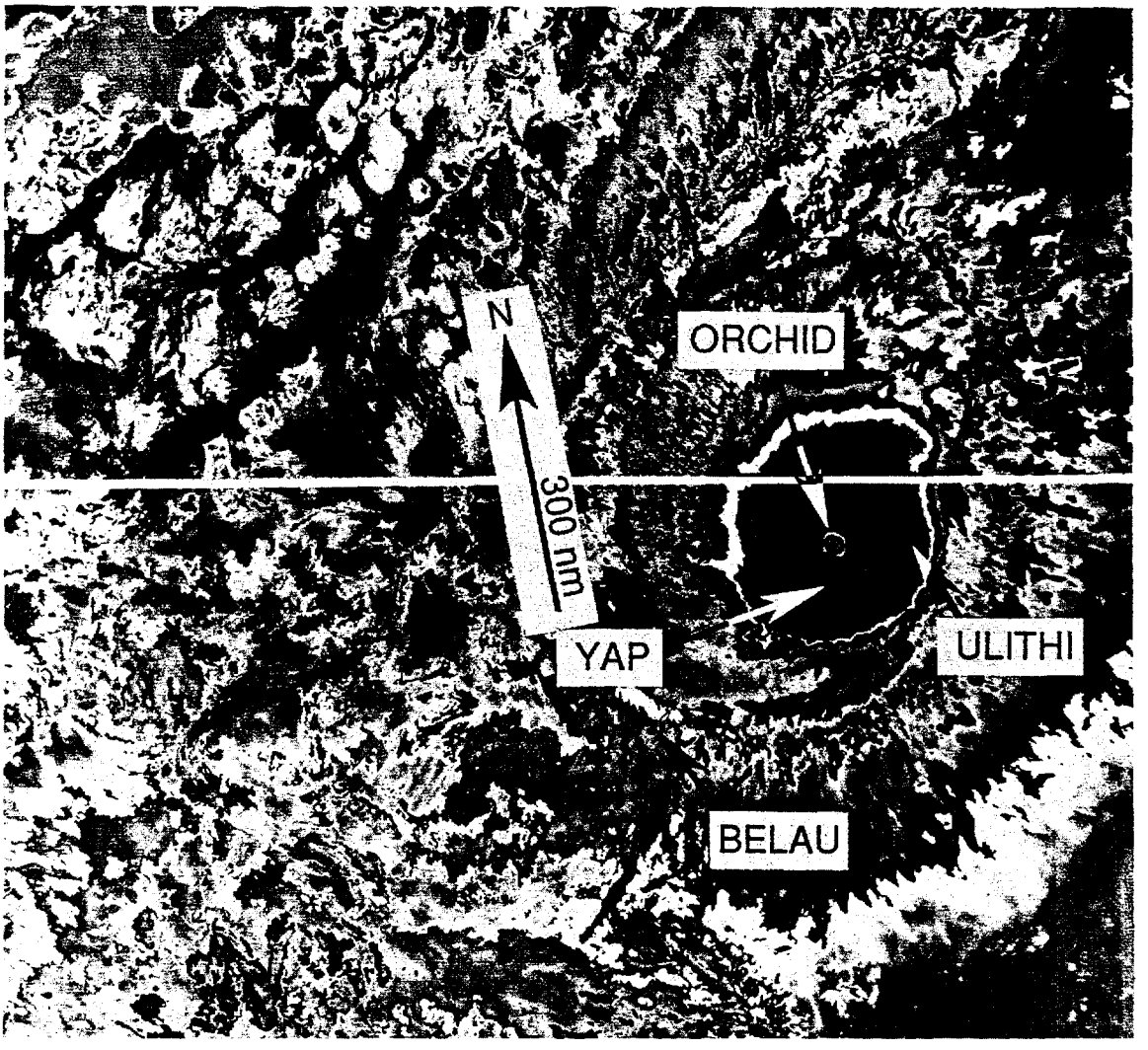

Figure 3-01-4. Enhanced infrared (EIR) imagery of Typhoon Orchid (01W) near maximum intensity. Note the small well-defined eye (102259Z January NOAA infrared imagery).

The second unusual aspect of Typhoon Orchid was the fact that during the two days from 101200Z to 121200Z when Orchid was the most intense (Figure 3-01-4), the Dvorak intensity estimates were 10 to 20 kt (5 to 10 m/sec) higher than the intensity reported by aircraft reconnaissance (Figure 3-01-5).

After reaching maximum intensity, Orchid continued moving northwestward. Between 110000Z and 140000Z (when the last warning was issued), Orchid came under the influence of the strong wintertime low-level northeast monsoonal flow. This, coupled with 200 mb westerly flow aloft, set up a strong vertical shearing environment in which the upper portion of Orchid was displaced toward the east. Once the central convection stripped away, the remaining surface circulation was then steered by the low-level northeast monsoonal flow toward the southwest before dissipating over water. This wintertime shearing situation was a common factor in the end of the last five significant tropical cyclones in November and December of 1986.

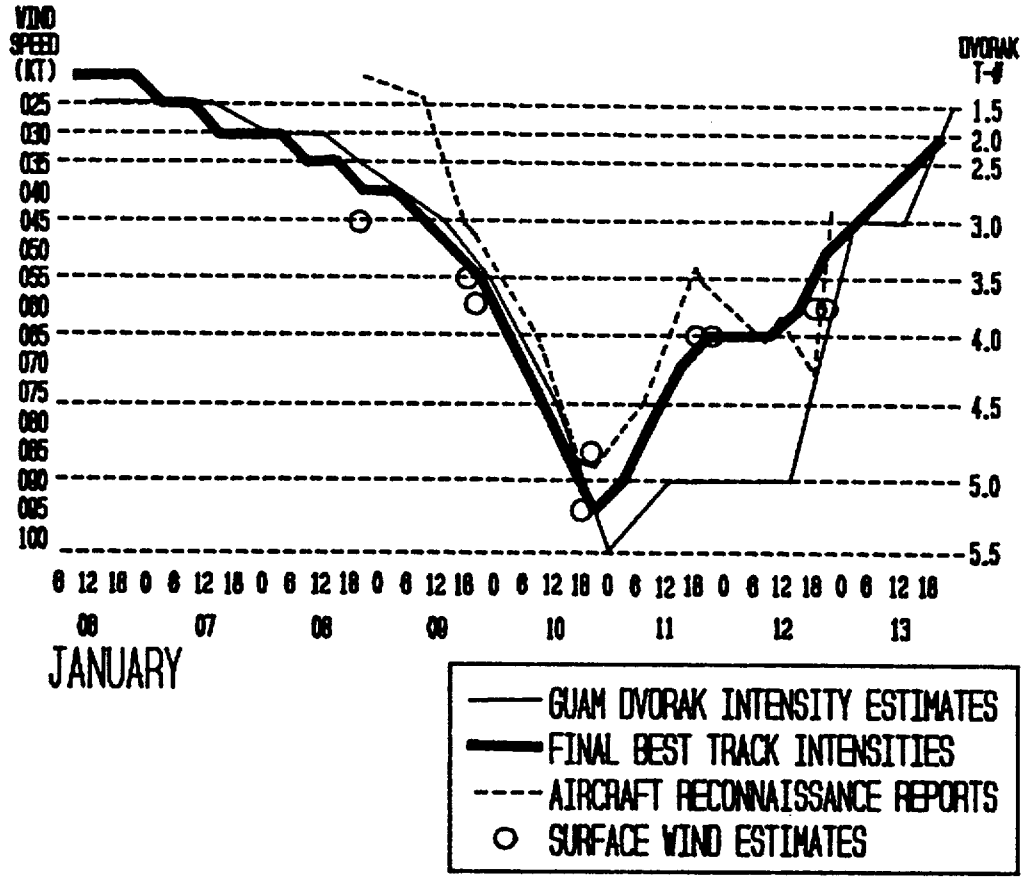

Figure 3-01-5. Plot of intensities obtained for Typhoon Orchid (01W) by aircraft reconnaissance vortex fixes and Dvorak analysis of satellite imagery. Also plotted are the Final Best Track intensities for comparison. Note the higher satellite intensities especially around the time of maximum intensity.